THIS OPINION WAS NOT WRITTEN FOR PUBLICATION

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 40

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MYUNG-CHAN JEONG

Appeal No. 1998-0927
Application No. 08/343,939

HEARD: Sep. 13, 2000

Before HAIRSTON, JERRY SMITH, and LEVY, Administrative Patent Judges.

HAIRSTON, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 15 through 21. In an Amendment After Final (paper number 17), claim 18 was amended.

The disclosed invention relates to a digital servo control method for controlling a voice coil motor for moving a head to a target track on a disk recording media. When one of a search mode, a transition mode or a track following mode is selected, one of a search mode interrupt service routine, a transition mode interrupt service routine or a track following mode interrupt service routine, respectively, is enabled as a result of a moving distance from a track position to the target track.

Claim 15 is the only independent claim on appeal, and it reads as follows:

15. A digital servo control method for controlling a voice coil motor for moving a head to a target track for every predetermined sampling period in a data storage system using disk recording media, said method comprising the steps of:

reading track position information for detecting a gray code of a current track on said disk recording media to derive a track position of said head;

selecting a target track for determining a moving distance for moving said head from said track position to said target track;

selecting one of a search mode, a transition mode and a track following mode as a result of said moving distance; and

enabling one of a search mode interrupt service routine, a transition mode interrupt service routine and a track following mode interrupt service routine for applying a control signal to said voice coil motor according to the

selected one of said search mode, transition mode and track following mode for controlling the velocity of said head for traversing said moving distance.

The reference relied on by the examiner is:

Funches et al. (Funches) 5,305,160 Apr. 19, 1994

Claims 15 through 21 stand rejected under 35 U.S.C. § 103 as being unpatentable over the admitted prior art in view of Funches.

Reference is made to the final rejection, the briefs and the answer for the respective positions of the appellant and the examiner.

OPINION

The obviousness rejection of claims 15 through 21 is sustained as to claim 15, but is reversed as to claims 16 through 21.

According to the examiner (Answer, pages 4 and 5), appellant's admitted prior art (AAPA) discloses all of the steps of claim 15 except for the enabling of an interrupt service routine (ISR). With respect to the interrupt service routine, the examiner indicates (Final rejection, pages 5 and 6) that:

> The Funches et al. reference reveals an ISR for applying a control signal to a voice coil motor (VCM), thereby controlling head velocity. Funches et al. furnish normal and low velocity seek mode ISRs, equivalent to the claimed search and transition mode ISRs, depending on whether the difference between the current head location and the destination track is greater than four tracks. . . . Funches et al. also provide a FINE CONTROL mode ISR, corresponding to the claimed track following mode ISR. On lines 62-64 of column 18, Funches et al. declares that the "FINE CONTROL mode is also referred to as the Track Following mode, and is used to maintain the heads centered on the desired track". Thus, the Funches et al. patent provides all three claimed ISR modes.
>
> At the time of the invention, it would have been obvious to one of ordinary skill in the art to have applied the teachings of Funches et al. to AAPA. The motivation would have been to more accurately control the VCM, as suggested by Funches et al.

Appellant argues (Brief, pages 9 and 10) that:

> Funches *et al*. provides a teaching of a single interrupt service routine as shown in Figs. 12A-12C and described starting at col. 14, line 37. In col. 14, Funches *et al*. indicates that the main interrupt service routine is performed "every 42 microseconds" as a result of an interrupt being sent to servo microprocessor 96 on a "constant recurring basis", *i.e.*, "once for each servo frame". Accordingly, Funches is contrary to claim 15, wherein the invention calls for the enablement of one of a search mode interrupt service routine, a transition mode interrupt service routine and a track following mode interrupt service routine *according to the selected one of said search mode, transition mode and track following mode* the selected one of a search mode, transition mode and track following

> mode being based on the moving distance from a current track position to a target track.

Funches states that the servo microprocessor 96 (Figures 4 and 6) services interrupts every 42 microseconds with the interrupt service routine (ISR) (column 14, lines 54 and 55, and column 17, lines 23 through 32). During the ISR, the mode that is selected to move the head to a desired track on the disk recording media depends upon the distance from the current position of the head to the desired track (column 17, line 68 through column 18, line 8). Although the main ISR services both the search and the transition modes of the seek mode in Funches, nothing in the claims on appeal precludes the use of the same ISR to service both of the modes. When the ISR services the search mode it becomes a search mode interrupt service routine, and when it services the transition mode, it becomes a transition mode interrupt service routine. The same holds true for the FINE CONTROL or track following mode "during subsequent interrupt services" (column 18, lines 58 through 64). Even if the ISR is not applied to the three different modes, we note that claim 15 only requires that the ISR be applied to a selected "one" of the three different modes, and that only "one" of the three different interrupt

service routines has to be enabled. In summary, the obviousness rejection of claim 15 is sustained.

The obviousness rejection of claims 16 through 21 is reversed because the examiner has not demonstrated how Funches performs all of the specific steps of these claims (Brief, pages 12 through 14).

DECISION

The decision of the examiner rejecting claims 15 through 21 under 35 U.S.C. § 103 is affirmed as to claim 15, and is reversed as to claims 16 through 21. Accordingly, the decision of the examiner is affirmed-in-part.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a).

AFFIRMED-IN-PART

Kenneth W. Hairston Administrative Patent Judge	)	
Jerry Smith Administrative Patent Judge	)	BOARD OF PATENT APPEALS AND INTERFERENCES

)
)
Stuart S. Levy)
Administrative Patent Judge)

KWH: tdl

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